

AMENDMENTS TO THE CLAIMS

Please amend the claims as follows:

LISTING OF CLAIMS:

Claims 1-4 (cancelled).

Claim 5 (original): A process for the preparation of canthaxanthin wherein said process comprises culturing a recombinant cell containing farnesyl pyrophosphate and isopentyl pyrophosphate under culture conditions sufficient for the expression of enzymes which catalyze the conversion of the farnesyl pyrophosphate and isopentyl pyrophosphate to canthaxanthin, said recombinant cell being a host cell transformed by an expression vector comprising a regulatory sequence and a polynucleotide containing the following DNA sequences which encode said enzymes:

- a) a DNA sequence which encodes the GGPP synthase of *Flavobacterium* sp. R1534 (crtE) or a DNA sequence which is substantially homologous,
- b) a DNA sequence which encodes the prephytoene synthase of *Flavobacterium* sp. R1534 (crtB) or a DNA sequence which is substantially homologous,
- c) a DNA sequence which encodes the phytoene desaturase of *Flavobacterium* sp. R1534 (crtI) or a DNA sequence which is substantially homologous,

d) a DNA sequence which encodes the lycopene clycase of *Flavobacterium* sp. R1534 (crtY) or a DNA sequence which is substantially homologous, and

e) a DNA sequence which encodes β -carotene β 4-oxygenase of microorganism E-396 (crtW_{E396}) or a DNA sequence which is substantially homologous;

and isolating the canthaxanthin from such cells or the culture medium.

Claim 6 (original): The process of claim 5 wherein said DNA sequences are:

a) a DNA sequence which encodes the GGPP synthase of *Flavobacterium* sp. R1534 (crtE),

b) a DNA sequence which encodes the prephytoene synthase of *Flavobacterium* sp. R1534 (crtB),

c) a DNA sequence which encodes the phytoene desaturase of *Flavobacterium* sp. R1534 (crtI),

d) a DNA sequence which encodes the lycopene cyclase of *Flavobacterium* sp. R1534 (crtY), and

e) a DNA sequence which encodes the β -carotene β 4-oxygenase of microorganism E-396 (crtW_{E396}).

Claim 7 (original): The process of claim 6 wherein:

a) the GGPP synthase has the amino acid sequence of Figure 8,

- b) the prephytoene synthase has the amino acid sequence of Figure 9,
- c) the phytoene desaturase has the amino acid sequence of Figure 10,
- d) the lycopene cyclase has the amino acid sequence of Figure 11, and
- e) the β -carotene β 4-oxygenase has the amino acid sequence of Figure 32.

Claim 8 (original): The process of claim 7 wherein:

- a) the DNA sequence encoding the GGPP synthase comprises bases 2521-3408 of Figure 7,
- b) the DNA sequence encoding the prephytoene synthase comprises bases 4316-3405 of Figure 7,
- c) the DNA sequence encoding the phytoene desaturase comprises bases 4313-5797 of Figure 7,
- d) the DNA sequence encoding the lycopene cyclase comprises bases 5794-6942 of Figure 7, and
- e) the DNA sequence encoding β -carotene β 4-oxygenase comprises sequences of Figure 31.

Claims 9-19 (cancelled).